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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE DEC. 27, 1957



Mercury from Gold

See Page 403

A SCIENCE SERVICE PUBLICATION



"Our American concept of radio is that it is of the people and for the people."

Freedom to LISTEN - Freedom to LOOK

As the world grows smaller, the question of international communications and world understanding grows larger. The most important phase of this problem is *Freedom to Listen* and *Freedom to Look*—for all peoples of the world.

Radio, by its very nature, is a medium of mass communication; it is a carrier of intelligence. It delivers ideas with an impact that is powerful . . . Its essence is freedom—liberty of thought and of speech.

Radio should make a prisoner of no man and it should make no man its slave. No one should be forced to listen

and no one compelled to refrain from listening. Always and everywhere, it should be the prerogative of every listener to turn his receiver on or off, of his own free will.

The principle of *Freedom to Listen* should be established for all peoples without restriction or fear. This is as important as *Freedom of Speech* and *Freedom of the Press*.

Television is on the way and moving steadily forward. Television fires the imagination, and the day is foreseen when we shall look around the earth from city to city, and nation to nation,

as easily as we now listen to global broadcasts. Therefore, *Freedom to Look* is as important as *Freedom to Listen*, for the combination of these will be the radio of the future.

The "Voice of Peace" must speak around this planet and be heard by all people everywhere, no matter what their race, or creed, or political philosophies.*

David Sarnoff

President and Chairman of the Board,
Radio Corporation of America.

*Excerpts from an address before the United States National Commission for UNESCO.



RADIO CORPORATION of AMERICA

FREEDOM IS EVERYBODY'S BUSINESS

PHYSICS

Ideal Standard of Length

Mercury made by neutron bombardment of gold produces a light wave which is most precise standard of length yet devised.

See Front Cover

► **MERCURY**, made from gold in the atomic pile by neutron bombardment, has now been obtained in large enough quantities to perfect methods of measurement by the most precise standard of length yet devised. This unit is a single wave of green light from a form, or isotope, of mercury with an atomic weight of 198 and, therefore, known as Mercury 198.

Research laboratories for a number of years have been using light waves for special types of length measurements, but the use of this isotope known as Mercury 198 provides precision not available before. The National Bureau of Standards, which now has Mercury 198 in reasonable quantities and has developed practical methods for its use in measurements, states that the discovery makes possible an "ultimate standard of length." The legal standard is a meter bar kept in the vaults of the Bureau.

University of California scientists announced the process a year ago. It was by means of a cyclotron at the university that gold was transmuted to Mercury 198. Quantities obtained were very small. The Bureau's work, carried out by Dr. William F. Meggers, is a refinement of other processes plus the development of mercury lamps and measuring procedures.

Measurements based on this mercury green light wave, which is 21 millionths of an inch long, will make possible length determinations precise to one part in 100 million. Such precision in the measurement of length has never before been attained by man, Dr. E. U. Condon, director of the Bureau, declares.

The advantages of a light-wave standard over a physical standard are that it is indestructible and exactly reproducible, he says, and that any laboratory with the necessary auxiliary equipment can have a basic standard on the premises.

Cadmium red radiation was adopted provisionally at the 1927 International Conference on Weights and Measures as

a wavelength standard. The fundamental advantage of Mercury 198 over cadmium is that it emits a more nearly perfect monochromatic light. By this is meant that the red, green, or other color used, is a single wavelength rather than multiple wavelengths extremely close together.

Cadmium consists of six principal isotopes that radiate slightly different waves. Other advantages of mercury are that it does not need special heating equipment as does cadmium, and that the human eye is seven times more sensitive to green light than to red.

Dr. Meggers is now experimenting with a number of lamps for using the mercury. The simplest is a glass tube the size of a cigarette with Mercury 198 sealed inside it. When excited by high-frequency radio waves, the mercury

glows and gives off energy in the form of light as shown on this week's cover of the *SCIENCE NEWS LETTER*. The Bureau expects at a later date to have lamps of this sort available for other scientific laboratories.

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AERONAUTICS

Skyway for Private Planes Links Canada and Mexico

► A **SECOND** skyway for private planes is planned by the Civil Aeronautics Administration. It is a 40-mile-wide route from Canada to Mexico, extending first from Pembina, N. D., to Laredo and Brownsville, Texas, but eventually from Winnipeg to Mexico City.

The skyway is intended solely for visual flying, and its use will keep private planes off commercial airlines and promote safety in the air. An airmarking program along the southern end of the skyway is already under way.

This route, to be known as Skyway Eleven, is the second airway for private planes sponsored by the CAA. The first, Skyway One, extends from Washington, D. C., to Los Angeles.

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PORTABLE DERRICK—This first completely portable electric oil well drilling rig is capable of boring two miles into the earth. Weighing 18 tons, its twin-masted derrick reaches as high as a 12-story building. It can be telescoped, folded and moved along the highway, which is expected to check rising drilling costs and increase the rate of well completions.

MEDICINE

New Approach to Malaria

Tetanus toxoid, given in conjunction with anti-malarial drugs, stimulates the body's defense forces against the disease.

➤ A NEW approach to the world-wide fight against malaria has been discovered by Dr. Eusebio Y. Garcia, senior malariologist of the medical research clinic at Binan in the Philippines.

Bouts of chills and fever did not come back as soon to plague the malaria victim when he was given, along with atabrine or chloroquine, doses of tetanus toxoid, Dr. Garcia found.

Tetanus toxoid is the detoxified poison of the tetanus, or lockjaw, germs. Members of the U. S. armed forces during the war knew it as one of the many "shots" given them for protection against diseases they might encounter. Modern mothers know it is given their babies along with shots against diphtheria and

whooping cough, so that when Junior steps on a nail he will be protected against the lockjaw danger grandmother feared from stepping on nails.

News of Dr. Garcia's work comes to American scientists through the New York Academy of Sciences which has awarded him a \$200 A. Cressy Morrison prize for it.

The use of tetanus toxoid is different from chemical, or drug, treatment of malaria and different, also, from use of germ chemicals, such as penicillin, to fight other germs in the body. Tetanus toxoid, he believes, acts as a stimulator to the body's own defensive forces. Immune mechanisms is the term scientists use for these defensive forces. They are

stimulated and enhanced, he thinks, by the tetanus toxoid, so that relapses in malaria patients after treatment do not come as often.

The significance of Dr. Garcia's work lies in the fact that he is using tetanus germs, which are bacteria, to fight germs which are protozoa and completely out of the bacterial germs' class. It is something like using a featherweight to stop Joe Louis, only more so because the bacteria and the protozoa are as different as plants and animals. Dr. Garcia's results are said to be the first successful attempts to check multiplication of protozoan parasites by stimulating immune mechanisms through a bacterial product.

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MEDICINE

Painless Shots Possible

By chilling the skin with a new metal applicator, it is possible to block the pain sensation felt by patients while getting injections.

➤ THE needle really won't hurt next time you get a shot of penicillin or some other hypodermically-injected drug if your doctor uses a method devised by three Harvard Medical School surgeons.

The method is to chill the skin briefly to about a freezing temperature before sticking in the hypodermic needle. The chilling is done with a pre-chilled metal applicator of about one-third to one-half inch diameter at its business end. The chilling does not hurt and does block the pain sensation felt by many patients, especially sick children, when the needle is pushed through the skin.

The chilling applicator and its successful use are described by Drs. Franc D. Ingraham, Donald D. Matson and Robert P. Woods in the *New England Journal of Medicine* (Nov. 20).

After trials with carbon dioxide snow, they developed a simple instrument consisting of a brass cylinder about nine inches long and about two inches in diameter. This is closed at one end, and

to the closed end is soldered a smaller brass cylinder. This smaller cylinder which becomes the business end of the instrument, is filled with solder, which is a rapid conductor of heat. The larger cylinder is wrapped with felt and filled with cracked ice to which anhydrous calcium chloride is added. A cork closes it. The contact end of the small cylinder is covered with a closely fitting hollowed-out rubber cap. For use, this rubber cap is removed, the end is wiped clean with alcohol or other antiseptic, and then applied for about 45 to 60 seconds to the previously cleansed skin where the hypodermic injection is to be given.

The instrument can also be used to kill the pain of the needle when blood is taken from a vein in the arm. It is not satisfactory, however, for injections of local anesthetics, presumably because the anesthetic fluid when injected stimulates different nerve endings in the skin from those made insensitive to pain by the chilling.

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PSYCHOLOGY

Planning Ability Impaired

Worry-relieving operation in mental patients has been found to affect the intelligence. If this surgery was done universally it would end all progress.

➤ MENTAL patients who undergo a surgical operation designed to cut out worry and relieve depression suffer a loss of their ability to thread their way through a printed maze, such as those commonly used in children's puzzles.

That the fairly common operation, called lobotomy, impairs this kind of ability to look ahead to the end of a road before making a turn, was discovered through study of 55 patients at the Kaneohe Hospital for the Insane on Oahu Island in Hawaii. Details are reported by Drs. Stanley D. Porteus and Henry N. Peters in *Genetic Psychology Monographs*.

Doctors have thought previously that the operation did not damage intelligence, because testing with other kinds of mental tests had failed to show up any impairment. The present study indicates that 81.8% scored lower on the maze test than they did before the operation. This, Dr. Porteus points out, does not represent the total loss in this type of intelligence because it is not known just how high the patients would have scored before they became ill.

Ordinarily, normal persons improve a great deal with practice on this maze test—so much so that it cannot be used for repeated testing. Tests on a group of criminals made for comparison with the patients showed that this improvement from practice lasts as long as four and a half years. This makes the lowering of scores of the operated patients all the more striking.

After a lapse of time, the patients gradually regain their losses, especially those whose mental disease symptoms have improved most. This fits in with what psychologists would expect, if the work of the severed nerve connections between the frontal lobes and other parts of the brain was gradually taken over by other nervous pathways.

Dr. Porteus believes these findings important not only from the point of view of how the operation affects the intelligence, but also as throwing light on the function of the frontal lobes of the brain. He now believes they are concerned chiefly with the ability to plan ahead, or foresight, apparently tested by the maze.

"There is a marked diminution in planfulness, and after varying intervals of time many of the patients recover this planfulness to a greater or lesser degree; some, however, hardly improve at all or the improvement is masked by the return of the psychotic behavior.

"Undoubtedly, because of these early and severe deficits, if everyone in the world were to be simultaneously lobotomized it would spell the end of all progress. Industry, except at the simplest levels, would cease. A population of 'cheerful drones' could hardly carry on the complex business of modern living. It is doubtful indeed whether human survival would be possible except at the most primitive levels and in the most favorable environment."

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MEDICINE

Cancer Funds Cross Seas

Grants were made by the U. S. National Cancer Institute for the first time to overseas researchers to promote international attack on the disease.

➤ A NEW kind of international search for important war secrets is on. Radioactive chemicals from the atom pile will be used. But the war will be against that common enemy of mankind, cancer.

The secrets concern the relation between the structure of certain chemicals and their ability to cause cancer and to affect the division of both normal and cancer cells in the body.

News of this international attack on



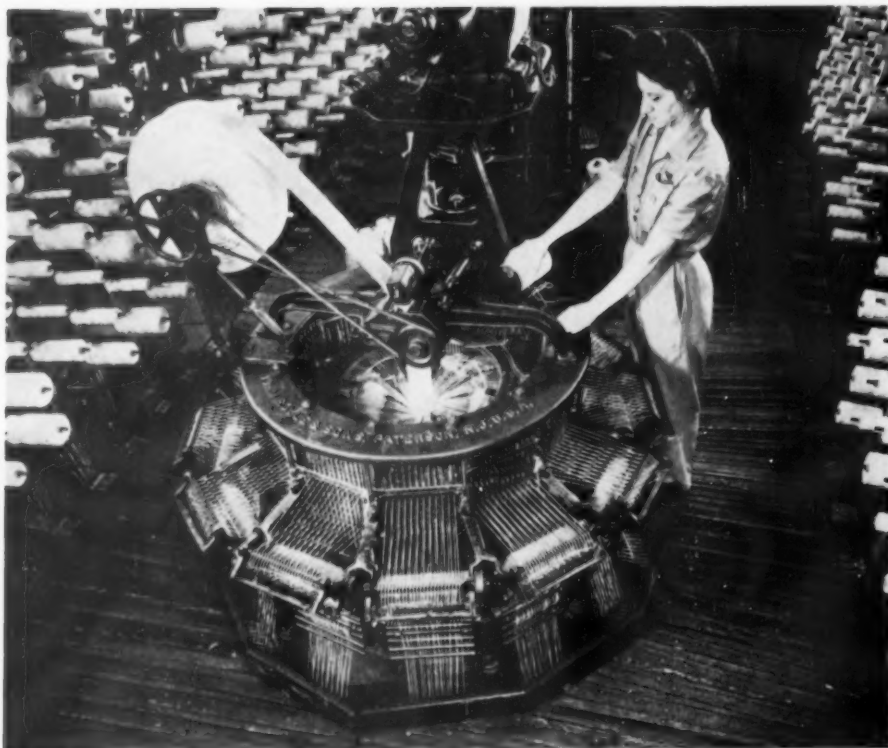
AUTOMATIC PILOT—This new, light-weight, all-electric pilot, normally mounted between the pilot and co-pilot, keeps the plane automatically on the radio beam. It was recently developed by the G-E Marine and Aeronautics Engineering Division for the Navy Bureau of Aeronautics.

cancer comes from the National Cancer Institute of the U. S. Public Health Service, Washington. For the first time in its 10-year history, the National Cancer Advisory Council has been asked for and has granted funds for cancer-fighting across the seas.

The sum of \$13,380 goes to Dr. A. Lacassagne at the Pasteur Institute in Paris. It will be used to create new organic chemicals, some of them tagged with atoms of radioactive elements, and to study their cancer-causing action and their effects on the sex and other endocrine glands. A relation between breast cancer and sex hormones, now being turned to use in hormone treatment of hopeless cancer patients, was long ago studied by Dr. Lacassagne. He is now, it appears, going to search further into the fundamentals of this relation.

At Hebrew University in Jerusalem, Dr. L. Doljanski will try to discover the chemical nature of substances extracted from living body tissues that promote the growth of cells. And he will study the effects of X-rays, radium, dyes, narcotic drugs and many other known chemicals on the division of cancer and normal cells. A sum of \$10,000, in two grants, has been awarded him to aid these studies.

For the first time, also, National Can-



INTRICATE WEAVING—This machine takes miles of cotton cord from scores of spools and weaves it into a jacket for a fire hose. If laid in a straight line, the cord in a 50-foot section of this jacket would extend 10 miles.

cer Institute funds will go to dental schools. The first signs of cancer in the mouth may often be detected by the dentist when he examines a patient's teeth. The grants to the dental schools will help more dentists learn to recognize cancer in its early, curable stage.

Mice play an essential part in the fight against cancer because in their small bodies and short lifespans scientists learn much that helps human can-

cer patients. One of the world's biggest and most important centers for breeding pedigreed mice was destroyed, with almost 100,000 mice, when the Jackson Memorial Laboratory at Bar Harbor, Me., was burned in a forest fire this fall. For rebuilding the institution and overcoming as fast as possible the bottleneck in cancer research caused by the destruction of the mice, the council has granted \$250,000.

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GENERAL SCIENCE

Industry's Support Needed

Basic research and science education should not be left to government financing for it might mean political control, according to George A. Sloan.

► **INDUSTRY** was challenged to provide major support of scientific research and higher education or suffer the consequences of a decline of the basic new knowledge and manpower upon which its progress is based.

Addressing the New York Academy of Sciences, George A. Sloan, president of the Nutrition Foundation, declared

that if industry does not supply both the push and the money for both basic research and science education, and financing is left to government, "political control may gain a disastrous foothold inside the laboratories where men are and should be simply and sincerely seeking after truth."

Industry's support of scientific investi-

gations will not be closely restricted to the direct interests of industry, Mr. Sloan promised, judging by the experience of the Nutrition Foundation, an organization of large food industries, which spends hundreds of thousands of dollars on fundamental research.

One of the results of this nutrition research has been the appraisal of a new vitamin of the B group that is important in protecting against anemia.

Every discovery of modern science opens many new avenues for continued investigation. Mr. Sloan said, citing "new knowledge which will harness nuclear fission to more productive uses than war."

"Night after night most of us are subjected to the flashings of multitudes of neon signs," he said. "We are apt to consider them as the device of some smart advertising man. We fail to realize that this commercial device is merely the adaptation of scientific studies having to do with the nature of electrical conduction in gases. Had it not been for the basic study of the pressure, volume, temperature relationships of gases, there would be no neon gas available for exploitation."

"The modern vacuum tube is a marvelous device, performing all sorts of services for mankind, contributing in a thousand ways to industrial and social progress. It was perfected by painstaking scientific work in industrial laboratories, but its roots go back to fundamental investigations which were not directed primarily toward commercial application."

"Similarly, our modern systems of mechanical refrigeration owe a great debt to the study of vapor pressure and the long and careful development of the laws of thermodynamics which long preceded the clever adaptations that, in due time, translated these matters into everyday servants."

Science is of political, economic, and social importance due to the fact that it is essential for the prosecution of modern war, Prof. W. A. Noyes, Jr., University of Rochester chemist and past-president of the American Chemical Society, told the Academy.

It is high time that scientists took a greater interest in the cause of peace, Prof. Noyes declared, explaining that UNESCO is the international organization that holds real promise of raising the scientific level throughout the world.

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A railway in Norway now crosses the Arctic Circle.

ASTRONOMY

Venus, Mars, Saturn Now Seen

Mars, distinguished by its red color, will exceed Saturn in brilliancy by more than three times as it approaches the earth. Venus is brightest planet.

By JAMES STOKLEY

► THREE bright planets can be seen in January evenings, two of which are shown on the accompanying maps. These give the appearance of the heavens around 10 o'clock at the beginning of January and an hour earlier in the middle. Toward the east, in the constellation of Leo the lion, are shown Saturn and Mars. Mars, the lower, which is distinguished by its red color, is about one and a third times as bright as Saturn. Until mid-February, Mars will approach the earth and get still brighter, until in brilliance it exceeds Saturn by more than three times.

Our third planet is Venus, which sets about two hours after the sun, toward the southwest, and so is gone by the times for which the maps are prepared. It is many times brighter than either Mars or Jupiter, so there is little doubt about which it is. Venus, in fact, appears long before any other star or planet. Its magnitude, minus 3.4 on the astronomer's scale in the first part of January, makes it some 20 times as bright as Mars.

Jupiter Now a Morning Star

As for the other planets, Jupiter is now a morning star, in the constellation of Ophiuchus, the serpent bearer. It rises about two hours before the sun. Mercury is too close to the sun's direction during most of the month to be seen at all, but toward the end of January it will be swinging eastward from the sun, so that in early February it may be glimpsed low in the west just after sunset.

As always in this time of mid-winter, the brightest stars to be seen in the evening are those in the south around the familiar figure of Orion, which can easily be identified with the aid of the three stars in a row that form the belt of the celestial warrior.

Above the belt is first magnitude Betelgeuse, and below is Rigel. Directly below this star, supposed to mark one of the warrior's feet, is an inconspicuous

constellation called Lepus, the hare, but next to it, toward the left, we find Canis Major, the great dog. This contains the brightest star of the night-time sky—Sirius, the dog star. This is not as bright as Venus, but that body, of course, is a planet, a member of the same family as the earth, including the dark bodies that revolve around the sun and are visible only by the sunlight they reflect to us. Sirius and the other stars are themselves suns, glowing globes of gas shining with their own luminosity.

Lesser Dog Constellation

Above Sirius, and a little farther east (left) is another dog, Canis Minor, the lesser dog, in which the star Procyon shines. Above this group we come to Gemini, the twins, with Castor and Pollux. Directly south as shown on the map of the southern skies, and opposite to Orion from Sirius, is Taurus, the bull, containing the star Aldebaran, red in color, and marking the bull's eye.

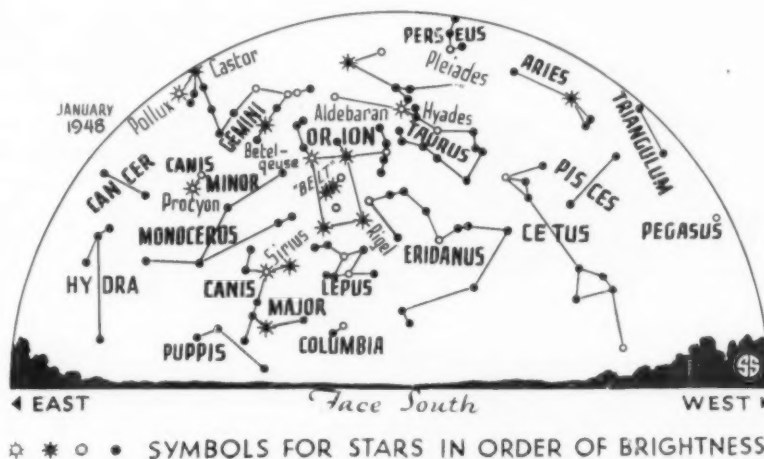
Nearly overhead we see Capella, in Auriga, the charioteer. As we descend toward the northern horizon we come to the pole star, in Ursa Minor, the lesser bear. Around this we find the familiar constellations of the northern sky that never go below the horizon, Draco, the dragon; Ursa Major, the great bear (of which the great dipper is part); Cassiopeia, the queen, and her husband, Cepheus.

Low in the east is Leo the Lion, of which the first magnitude star Regulus is a member, though it is now too low to be seen in its full brilliance. And also this group is the temporary home of Saturn and Mars.

Since the moon and planets all move through the same part of the sky, each month the moon passes each of the planets. Thus, on the evening of Jan. 13, at 11:25 p.m. (EST), it passes Venus, well to the south. On the evening of the 26th (at 11:39 p.m., EST) it passes Saturn, an even greater distance to the north. Early the next morning (12:34 a.m., EST) it passes Mars, but this time much more closely. In fact, people in the northern part of the United States and eastern Canada will be able to see an occultation, in which the moon actually hides the planet for a time. This is the first of a series of such occultations of Mars in 1948, some of which will be much better than the one this January. That coming on the evening of Sept. 6, for example, will be seen all over the United States.

Mars Coming Near Earth

This is not the only interesting thing about Mars during 1948. It is going to come closer than it has for several years. On Jan. 1 it will be some 83,356,000 miles from the earth, but it is drawing closer and closer. In the middle of February, it will be directly opposite the sun, and then Mars and the earth will be only 63,019,000 miles apart. This may not seem a short distance, but for Mars it is a fairly close approach, although at rare intervals it can come to within



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DRAFTSMEN OF DREAMS:
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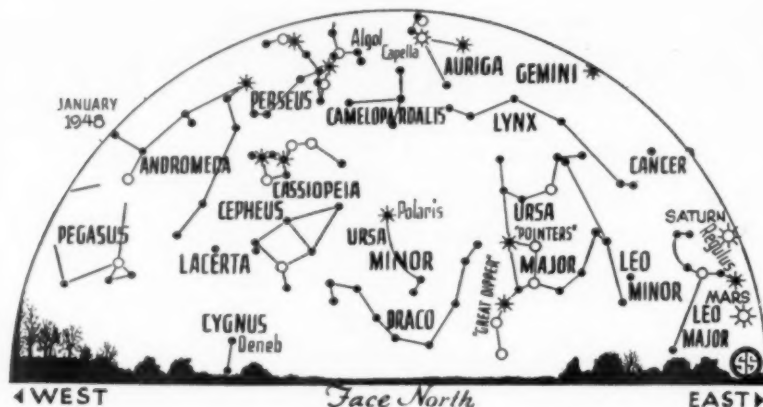
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about 35,000,000 miles. Thus the red planet will be unusually bright, and astronomers who make a specialty of planetary observations will have their telescopes trained on it steadily.

Other events on the list for 1948 include three eclipses, but none of them are particularly exciting to the astronomers. The first comes on April 23, when the moon is partially eclipsed as it enters partly into the shadow of the earth. This will not be visible at all in the United States, but may be observed from Asia, the Indian Ocean, the Pacific Ocean and Antarctica.

Second Eclipse of Year

Two weeks later, on May 8 and 9 (since it occurs on both sides of the International Date Line) the year's second eclipse occurs—one of the sun. Though the moon will come squarely between sun and earth, the moon's distance will be rather greater than average and so its apparent diameter in the sky will not be as great as that of the sun. Hence, the sun will not be completely covered. Even where the eclipse can be seen best, a ring of solar surface will remain visible around the dark disk of the moon. Such an eclipse is called "annular," from the Latin word for a ring. This will be seen along a path over the Indian Ocean, Siam, Indo-China, the China Sea, Japan and the Pacific Ocean. A larger area around the path will see the sun partially eclipsed by the moon.

On Nov. 1 comes the third eclipse of the year, a total one of the sun. But the region where it is visible is along a path over Africa, the Indian Ocean and the waters south of Australia, an inaccessible region to which few if any astronomers will go for the purpose of making observations.

The new year will also bring a comet that is visible to the naked eye. Bester's comet, discovered by a South African

astronomer of that name in September, 1947, according to early calculations, may reach a magnitude of about 2.5 at the end of February. This is well above the 6th magnitude usually taken as that of the faintest star visible to the unaided eye.

Diffuse Patch of Light

However, the comet is a diffuse patch of light and not nearly as easily located as a star of the same brilliance. Furthermore, when it is brightest, it will be too nearly in the direction of the sun to be located. Around the middle of March it will travel across the northern sky, passing near the star Altair, in Aquila, the eagle, and then near Vega, in Lyra, the lyre. These constellations, at that time of year, will be visible in the east in the early morning hours, and by then the comet will be considerably fainter. Thus, it seems most unlikely that Bester's comet will rival Halley's and other famous naked-eye comets of the past.

Time Table for January

Jan.	EST	
2	1:00 a. m.	Sun nearest earth; 91,446,000 miles
3	6:13 a. m.	Moon in last quarter
8	8:00 a. m.	Mercury beyond sun
8	8:56 a. m.	Moon passes Jupiter
11	2:44 a. m.	New moon
13	1:00 a. m.	Moon farthest; 252,570 miles
19	11:25 p. m.	Moon passes Venus
19	6:32 a. m.	Moon in first quarter
26	2:11 a. m.	Full moon
	6:00 a. m.	Moon nearest; 221,490 miles
	11:39 p. m.	Moon passes Saturn
28	12:34 a. m.	Moon passes Mars

Subtract one hour for CST, two hours for MST, and three for PST.

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One job of the astronomer is to study the atmospheres of the other planets to determine their chemical composition and extent.

A record parachute drop was made when one carrying scientific instruments was released from a rocket at an elevation of 59 miles.

PHARMACOLOGY

New Poison Antidotes

There is a possibility that the new hayfever medicines, such as benadryl, pyribenzamine and others may act as antidotes to curare and certain other poisons.

► THE possibility that the new hayfever medicines, benadryl, pyribenzamine, neoanergan and others, may act as antidotes to certain poisons was suggested by the French scientist who discovered the mother substances of these modern hayfever medicines.

He is Dr. Daniel Bovet, now at the Instituto Superiore di Sanita in Rome, but for about 20 years the only pharmacologist at the Pasteur Institute in Paris. While there he not only discovered the first of the anti-histamine chemicals which relieve hayfever and hives, but with Drs. E. Trefonel and F. Mitti discovered that sulfanilamide is the active part of the original German prontosil. The whole development of the sulfa drugs is based on this discovery.

The South American Indian arrow poison, curare, and certain other poisons and some purgatives, he reported, appear to act in the body by liberating histamine. The new hayfever drugs are noticeably antagonistic to the action of these poisons as well as to histamine. Study of the poisons mentioned, he pointed out, has opened up an interesting and so far little explored field.

Relative newcomers to the hayfever drugs of the anti-histamine class are thephorin, described by Dr. C. Lehman of Hoffman-La Roche, Inc., at Nutley, N. J.; antistine, reported by Dr. Rolf Meier of Ciba, Ltd., and the University of Basle, Switzerland; thenylene or histadyl; nepera and rhone pouleuc.

All of these and the more familiar benadryl, pyribenzamine and neoanergan have about the same pattern of action, Dr. Samuel M. Feinberg of Northwestern University Medical School stated.

All, with one exception, are local anesthetics. All show their greatest effect on hives and other forms of itching skin. They are about equally effective in relieving the sneezing and other symptoms of hayfever, including the kind that may come at non-hayfever seasons. None of them is very effective in asthma.

All have about the same undesirable effects, including that of causing sleepiness with lassitude, weakness and inability to concentrate. Dizziness and

nervousness are other common undesirable effects.

Curiously, these drugs not only vary somewhat between themselves in their effects, but they also vary in the response of the patient. That is, one with the highest sleepiness effect in general may cause less sleepiness in some individuals.

Science News Letter, December 27, 1947

MICROSCOPY

New Lens Magnifies Virus 200,000 Times Actual Size

► VIRUSES no longer are protected by their infinitesimal size because a new "double lens" has been experimentally developed for use with the electron microscope, which provides an extraordinary degree of light contrast and detail at magnification from 200,000 to 300,000 times actual size.

The importance of this new experimental lens not only in the study of virus infections but in enzyme action and even cancer, was reported jointly by Dr. James Hillier and S. G. Ellis, of the RCA Laboratories, Princeton, N. J., at the first international conference of the Electron Microscope Society of America, at the Franklin Institute in Philadelphia.

In addition to the high magnification viewer, a deflection focusing system was also developed. Its simplicity was emphasized by the scientists by comparing it to a range-finder on a conventional camera. The electron microscope specimen is alternately illuminated from two directions giving two images if it is out of focus. Even an inexperienced operator can obtain a clear image by adjusting the focusing control until the two images are accurately super-imposed.

A leak detector for vacuum equipment was demonstrated for the first time by Herbert Nelson of the RCA Victor Division, Harrison, N. J., before the same meeting. It is portable and sniffs out leaks so small that molecules of air have trouble squeezing through in such devices as the electron microscope, electron tubes, X-ray tubes, cyclotrons and vacuum stills.

Science News Letter, December 27, 1947



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Bounty for the Birds

► CHRISTMAS giving, it is pretty generally agreed, should not be confined to one's kinsfolk and closest friends. In times like these, when so many of our unknown neighbors are needy, our bounty must overflow the boundaries of our immediate acquaintanceship.

It may require a little sacrifice to bring a measure of Christmas cheer to our hard-pressed human neighbors, but it costs us practically nothing at all to distribute largesse to our lesser brothers, the winter birds. They will be glad of the crumbs from the table, of scraps of suet trimmed from a roast before it is put into the oven. A simple pan of water, warmed up to the temperature of good hot coffee so that it will not freeze so quickly, will be high wassail for them.

Birds will accept your gifts gratefully even if they are only tossed out onto the ground or the crusted surface of frozen snow. It is better, though, to provide some kind of feeding tray, preferably in some corner with shelter from the wind, and as well as possible out of the reach of prowling cats. Food on such a tray will not be wasted through scattering or by burial in loose snow.

Suet is especially prized by birds. It is one of the best of fuel-foods, to keep their small bodies warm against the

cold to which they are always exposed, even on relatively good winter days. This also should be secured in some way to prevent a whole lump from being carried off and monopolized by one greedy individual. Squirrels are fond of suet, too, and will steal the birds' supply if they get a chance.

Many persons make a kind of suet pudding by melting the suet, adding raisins, cracked grain and other things that birds like, and pouring the mixture into a half-coconut-shell or some other container to harden. Hung up on a wire, this is difficult for squirrels to get at, and no bird can get more than a fair beakful at a time.

A much simpler suet-holder can be made of an old-fashioned wire soap-dish. This can be hinged against a tree trunk with a couple of staples or bent-over nails, with another bent nail on the other side left free to turn as a latch. Birds are able to peck out the suet through the meshes, but squirrels find the cage completely inaccessible.

Science News Letter, December 27, 1947

NUCLEAR PHYSICS

Giant Magnet Assembled

Constructed for the new 400-million-electron-volt synchro-cyclotron at Columbia University, it promises to answer many questions about the atom.

► A GIANT magnet, constructed of more than 2,000 tons of steel with miles of copper coils, was assembled at Irvington-on-Hudson, New York. It promises to lead to new facts about the atom and possible new weapons against cancer.

The magnet is for the new 400-million-electron-volt synchro-cyclotron at Columbia University's nuclear physics research center on Nevis, an estate given to the university a dozen years ago by Mrs. T. Coleman duPont. Completion of the new scientific tool for probing atomic forces is scheduled for next summer. Built in cooperation with the Navy through the Office of Naval Research, it will be one of the mightiest atom-smashers in the world.

Tiny charged particles, travelling a hundred miles between source and target in the new instrument, are expected to answer some of the fundamental questions about the structure of matter. Dr. John R. Dunning, scientific director

of the project, predicted that the new high-power bombardment of the atom may produce "new isotopes which have never been studied before and which will probably have interesting properties from both the physical and chemical standpoint.

"Such information should go a long way to clear up the principles of nuclear structure," he explained.

Declaring that "the Columbia cyclotron at Nevis may open a new frontier in physics," another university scientist, Nobelist I. I. Rabi, suggested that a new attack on malignant tissues such as cancer in the body might be made with the atom-smasher.

The physicist said that highly penetrating protons, near the end of their range in the new instrument, could be used to bombard affected areas deep in the body without great damage to healthy tissue. This would be possible because the particles produce more ionization as they slow down.

Science News Letter, December 27, 1947



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Books of the Week

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AN APPROACH TO RADIO—J. B. Shrewsbury—*Electronic Industries*, 288 p., illus., \$4.50. A practical guide for the beginner.

DAWN OF CREATION—J. Carroll Mansfield—*Lothrop, Lee and Shepard*, 238 p., illus., \$2.75. The story of the earth and life on it—from the origin of our solar system to the rise of civilization—told for younger teen-agers.

DESERT ANIMALS—Rita Kissin—*McKay*, 28 p., illus., \$2.50. An attractive book, in colored pictures and verse, for the very young reader.

DESERT PARADE—William H. Carr—*Viking*, 96 p., illus., \$2.50. A copiously illustrated guidebook to the plants and animals of the southwestern United States.

ELEMENTS OF ACOUSTICAL ENGINEERING—Harry F. Olson—*Van Nostrand*, 2nd ed., 539 p., illus., \$7.50.

EMOTIONAL MATURITY: Development and Dynamics of Personality—Leon J. Saul—*Lippincott*, 338 p., \$5.00. A basis for the understanding of neuroses and the atomic age through better knowledge of the loves, hates, desires and fears of men.

FISHES OF THE GREAT LAKES REGION—Carl L. Hubbs and Karl F. Lagler—*Cranbrook Inst.*, Bulletin No. 26, 186 p., illus., \$3.00. An expanded version of "The Fishes of the Great Lakes and Tributary Waters," this descriptive handbook has pictures and color plates to aid in identification of the species.

THE GIFTED CHILD GROWS UP—Lewis M. Terman and Melita H. Oden—*Stanford Univ.*, 448 p., \$6.00. Vol. IV of the "Genetic Studies of Genius" considers the physical, professional, marital, educational and financial status of Terman's original group of "1,400 gifted children" at average age 35.

GROWTH REGULATORS: A Practical Handbook—John W. Mitchell and Paul C. Marth—*Univ. of Chicago*, 129 p., illus., \$2.50. Describes the various uses of plant

hormones in weed control, plant growth, and storage of plant products.

HEALTH INSTRUCTION YEARBOOK, 1947—Oliver E. Byrd—*Stanford Univ.*, 325 p., \$3.00. Current information digested from 1947 literature on all phases of health, and chaptered according to subject matter.

HORMONES AND HORTICULTURE—George S. Avery, Jr., Elizabeth B. Johnson, et al.—*McGraw-Hill*, 326 p., illus., \$4.50. Addressed to those engaged in plant growth or research, this book summarizes available information, giving specific applications for plant growth control.

INTERTONGUING MARINE AND NONMARINE UPPER CRETACEOUS DEPOSITS OF NEW MEXICO, ARIZONA, AND SOUTHWESTERN COLORADO—William S. Pike, Jr.—*Geol. Soc. of Am.*, Memoir 24, 103 p., illus., \$2.25.

THE LIFE AND TIMES OF TYCHO BRAHE—John Allyn Gade—*Princeton Univ.*, 209 p., illus., \$3.50. A well-written account of the life and works of this 16th century astronomer.

MENTAL HYGIENE—Herbert A. Carroll—*Prentice-Hall*, 329 p., \$5.00. An elementary text, for college students, on the dynamics of personal and social adjustment.

PHYSIOLOGICAL AND PSYCHOLOGICAL FACTORS IN SEX BEHAVIOR—S. Bernard Wortis, et al.—*N. Y. Acad. of Sci.*, Vol. XLVII, Art. 5, 62 p., paper, \$1.25.

PRELIMINARY LIST OF THE BIRDS OF MARYLAND AND THE DISTRICT OF COLUMBIA—Irving E. Hampe and Haven Kolb—*The Nat. Hist. Soc. of Md.*, 76 p., illus., paper, \$1.00.

TEACHING PSYCHOTHERAPEUTIC MEDICINE

MEDICINE

BAL Restores Eyesight

➤ A PATIENT whose eyesight was damaged by arsenic has had his vision restored by treatment with BAL, anti-war gas chemical which has saved lives and health of patients poisoned by arsenic, mercury, gold and lead.

This latest use of BAL, and the first in which it restored eyesight, is reported by Dr. Sidney Friedenber of Camden, N. J., in the *Journal of the American Medical Association* (Dec. 20).

The patient was a 49-year-old man who was losing his eyesight because of damage to the optic nerve from arsenic. The arsenic was given him in the form of trypanamide for treatment of syphilis. Two days after the second dose of this standard anti-syphilis drug, he could not see the sidewalk when walking.

BAL was started at once and was

—Helen Leland Witmer, ed.—*Commonwealth Fund*, 463 p., \$3.75. Textbook based on a postgraduate course in psychotherapy and the means of applying it in general medical practice.

THE RELATION OF DISEASES IN THE LOWER ANIMALS TO HUMAN WELFARE—William A. Hagan, et al.—*N. Y. Acad. of Sci.*, Vol. XLVIII, Art. 6, 125 p., paper, \$2.50.

RECONNAISSANCE GEOLOGY OF PORTIONS OF VICTORIA ISLAND AND ADJACENT REGIONS ARCTIC CANADA—A. L. Washburn—*Geol. Soc. of Am.*, Memoir 22, 142 p., pictures unpaginated, illus., \$4.00.

THE SCIENCE AND ENGINEERING OF NUCLEAR POWER—Clark Goodman, ed.—*Addison-Wesley*, \$7.50. Based on a series of seminars at the Massachusetts Institute of Technology in October, 1946, this book presents the underlying principles of chain-reacting systems and industrial applications of nuclear energy for the non-specialist.

SOME ASPECTS OF RED CELL PRODUCTION AND DESTRUCTION—Eric Ponder, et al.—*N. Y. Acad. of Sci.*, Vol. XLVIII, Art. 7, 125 p., paper, \$2.00.

TOM EDISON: Boy Inventor—Sue Guthridge—*Bobbs-Merrill*, 200 p., illus., \$1.75. Biography of the early life of Edison, in convenient large print for young readers.

UNIPOLAR LEAD ELECTROCARDIOGRAPHY—Emanuel Goldberger—*Lea and Febiger*, 182 p., illus., \$4.00.

WEATHER ELEMENTS—Thomas A. Blair—*Prentice-Hall*, rev. ed., 401 p., illus., \$5.65. Principles and facts, intended to convey an elementary understanding of physical processes basic to weather phenomena; observation methods and instruments are also considered.

WOMEN DOCTORS TODAY—Sally Knapp—*Crowell*, 184 p., illus., \$2.50. Twelve biographies of women physicians and their varied work in modern medicine.

Science News Letter, December 27, 1947

YOUR HAIR AND ITS CARE

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given by injection every day for 10 days. Nine days later his vision was normal.

Damage to the optic nerve by trypanamide therapy has occurred previously in the course of syphilis treatment. In the early stages this damage and loss of vision is only temporary but in later stages it may be permanent.

"In this patient," Dr. Friedenber reports, "the unusually rapid return of vision was probably due to the prompt use of BAL following his visual complaints."

The word, BAL, stands for British Anti-Lewisite. Its chemical name is 2, 3 dimercaptopropanol. It was developed by the British to counteract the war gas, Lewisite, which owes its poisonous action to the arsenic it contains.

Science News Letter, December 27, 1947

• New Machines and Gadgets •

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C. and ask for Gadget Bulletin 394. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

❁ **FIRE-RESISTANT YARN**, suitable for automobile seats and similar uses, is also self-extinguishing, and immune to oil, grease, and mild acids, it is claimed. It is also said to be fade-proof, colorfast, waterproof, and will not rot. Similar yarn for tablecloth is under development.

Science News Letter, December 27, 1947

❁ **CRITICISM BOARD** for public speaking, recently patented, consists of a box in front of the speaker with electric signs visible to him which may be flashed on and off by a critic in the audience. The one-word signs include such expressions as posture, force, pitch, emphasis and gesture.

Science News Letter, December 27, 1947

❁ **X-RAY PHOTOMETER** is an electrical instrument capable of providing a continuous analysis of flowing streams of fluids and gases by measuring and comparing X-ray absorption of a sample and a standard. It gives an economical and rapid means of making chemical comparisons.

Science News Letter, December 27, 1947

❁ **HEATER AND STIRRER** is a small instrument to insert in a beverage, as shown in the picture, which contains a cartridge-like heating charge, and the stirrer. Spring action sets the chemical heat charge when the handle is pulled



back and released. Heating is without fumes or odor; refills are available.

Science News Letter, December 27, 1947

❁ **SAND SPREADER**, to distribute sand on slippery ice near the home, is a canvas container with a long pouring neck and convenient handles. It is sturdily constructed, holds 25 pounds of sand, and has a tie-string to keep the contents from leaking when the device is not in use.

Science News Letter, December 27, 1947

❁ **HUMIDITY INDICATOR** provides readings of relative humidity accurate

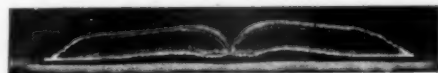
within one percent for general conditions. The instrument, with dry and wet bulb thermometers in one housing, has a simplified slide rule calculator on the front to give direct humidity readings.

Science News Letter, December 27, 1947

❁ **ELECTRIC DEVICE**, improved type for predicting with greater speed and accuracy the behavior, reactions and properties of chemical substances, is described as a calculator to compute molecular vibration frequencies. The device, called a potentiometric equation computer, is primarily for research laboratories.

Science News Letter, December 27, 1947

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